DOCUMENT RESUME

ED 420 853 CS 013 245

AUTHOR Agnello, Carol; Jockl, Peter; Pearson, Isabel; Velasco, Daniel

TITLE Improving Student Reading Comprehension in the Content Areas through the Use of Visual Organizers.

PUB DATE 1998-05-00

NOTE 66p.; M.A. Action Research Project, Saint Xavier University and IRI/Skylight.

PUB TYPE Dissertations/Theses (040) -- Reports - Research (143)

EDRS PRICE MF01/PC03 Plus Postage.

DESCRIPTORS Action Research; *Content Area Reading; *Instructional Effectiveness; Intermediate Grades; Junior High Schools; Middle Schools; Reading Achievement; *Reading Comprehension; *Reading Improvement; Tables (Data); Visual Aids

IDENTIFIERS *Graphic Organizers; *Middle School Students

ABSTRACT

This report describes a program for using graphic organizers to enhance reading comprehension in the content areas. The targeted population consisted of middle school students in regular education classes at four different locations in a large metropolitan area. Graphic organizers will aid visually/spatially talented students as well as visually/spatially challenged students and will increase positive attitudes toward reading in the content area. Analysis of probable cause data revealed that students have low reading comprehension in the content area. Recent research states that graphic organizers will benefit all students and students can enhance their weaker intelligences through practice. Additionally the data suggests that teacher made graphic organizers will benefit the students the most. A review of solution strategies suggested by knowledgeable others, combined with an analysis of the problem setting,resulted in the selection of one major category of intervention: the use of four different graphic organizers to enhance reading comprehension in the content areas. Post intervention data indicated an increase in all students' reading comprehension. Those students who were visually/spatially challenged showed the greatest increase in reading comprehension. (Contains 40 references, and nine tables and 13 figures of data. Appendixes contain a multiple intelligence inventory, lesson plans, student interview questions, and a reading style survey.) (Author/RS)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

CS

ED 420 853

IMPROVING STUDENT READING COMPREHENSION IN THE CONTENT AREAS THROUGH THE USE OF VISUAL ORGANIZERS

Carol Agnello
Peter Jockl
Isabel Pearson
Daniel Velasco

An Action Research Project Submitted to the Graduate Faculty of the

School of Education in Partial Fulfillment of the

Requirements for the Degree of Master of Arts in Teaching and Leadership

Saint Xavier University & IRI/Skylight

Field-Based Masters Program

Chicago, Illinois

May, 1998

CS013245

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☑ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY
C. Agnello
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

SIGNATURE PAGE

This project was approved by

Amy S. Hanson

Advisor

Lois Andrews

Advisor

Beverly Gulley

Dean, School of Education

ABSTRACT

This report describes a study for using graphic organizers to enhance reading comprehension in the content areas. The targeted population consisted of middle school students in regular education classes at four different locations in a large metropolitan area. Graphic organizers will aid visually/spatially talented students; as well as visually/spatially challenged students and will increase positive attitudes toward reading in the content area.

Analysis of probable cause data revealed students have low reading comprehension in the content area. Recent research states that graphic organizers will benefit all students and students can enhance their weaker intelligences through practice. Additionally the data suggests that teacher made graphic organizers will benefit the students the most.

A review of solution strategies suggested by knowledgeable others, combined with an analysis of the problem setting, resulted in the selection of one major category of intervention: the use of four different graphic organizers to enhance reading comprehension in the content areas.

Post intervention data indicated an increase in all students' reading comprehension. Those students who were visually/spatially challenged showed the greatest increase in reading comprehension.

TABLE OF CONTENTS

CHAPTER 1 - PROBLEM STATEMENT AND CONTEXT....1

General Statement of the Problem....1

Description of Sites....1

National Context of the Problem....10

CHAPTER 2 - PROBLEM DOCUMENTATION....12

Problem Evidence....12

Probable Cause (Site Based)....13

Probable Cause (Literature Based)....14

CHAPTER 3 - THE SOLUTION STRATEGY....16

Literature Review....16

Project Objectives and Processes....26

Project Plan of Action....26

Methods of Assessment....28

CHAPTER 4 - PROJECT RESULTS....30

Historical Description of the Intervention....30

Presentation and Analysis of Results....32

Conclusions and Recommendations....40

REFERENCES....43

APPENDIX

A MULTIPLE INTELLIGENCE INVENTORY....46

B LESSON PLANS....48

C STUDENT INTERVIEW QUESTIONS....57

D READING STYLE SURVEY....60

CHAPTER 1

PROBLEM STATEMENT AND CONTEXT

Statement of Problem

A connection can be drawn between the visually/spatially intelligent student who creates a graphic organizer while reading in a content area and successful comprehension in that content area. There is, however, uncertainty whether or not the use of a graphic organizer benefits the comprehension of a student who is not visually/spatially intelligent. Evidence for the existence of this problem includes teacher and school kept records that document the students' low reading comprehension. The students targeted for this study are middle school students (sixth to eighth grade) who have not shown themselves to be strong in the area of visual/spatial intelligence, as determined by a multiple intelligence inventory.

Description of Sites

The research takes place at four Sites, A, B, C, and D.

Site A: Local Setting

Site A is located in a western suburb of a large city. It is a small district that consists of three schools. The school of 254 is primarily attended by a White non-Hispanic community. The average class size is 20 students. When the IGAP (Illinois Goals Assessment Plan) tests were given, 90% of the students took those tests. The results placed Site A above the state average in all areas (see Table 1).

Table 1
IGAP Scores for 1995-1996

	Reading	Writing	Social Sciences
School	271	25.3	307
District	271	25.3	307
State	238	24.4	246

There is a small population of Limited-English-Proficient students in this school. Limited-English-Proficient students are those who have been found to be eligible for bilingual education.

The average pupil-teacher ratio is 15.7:1. The average teaching experience of this faculty is 13.2 years. The number of teachers in this district with Master's degrees is 65.4%. The pupil-administrator ratio is 197.0:1. All of the administrators in this district have a doctorate.

In January of 1997, a thorough review of the district facilities was done. Facilities in all three schools were found to nicely accommodate the educational needs of the students they serve. There is sufficient space and the structures are very well maintained. The current grade level configuration utilized in Site A's district of K-2, 3-5, and 6-8 permits very effective use, balanced class size within a grade level, and efficient staff deployment. The 6-8 building at Site A was recently remodeled and a new multi-purpose/gym was added as well as new classrooms. This is the only middle school in the county to have a photography lab.

The time devoted to the teaching of core subjects is the average number of minutes of instruction per 5-day school week in each subject area divided by 5. English includes all language arts courses. At Site A the time spent teaching the core subjects is above the state average in some cases and below the state average in others (see Table 2).

Table 2

Time Spent on Core Subjects

	Mathematics	Science	English	Social Studies
School	40	90	96	40
District	40	90	96	40
State	48	44	90	45

Site A is in the process of changing from a junior high to a middle school. This change was designed to be a three year process. They are now in the second year of this change. The sixth and seventh grades are on a middle school block scheduling format and the eighth grade is still on a junior high period schedule. Next year the entire school will be on a middle school block schedule. Each block will be 50 minutes long. Part of the purpose for this scheduling is to allow each team flexibility of time to engage in more comprehensive activities. The other part of the purpose is to envelop the middle school philosophy of dealing with the whole child, academically, emotionally, and socially. The faculty has been trained for the advisor/advisee program and many teachers at Site A are currently advisors. Next year all the teachers at Site A will be advisors. For the past three years, the various teams have attended the National Middle School Conferences, the Illinois State Middle School Conferences and regional meetings relating to the middle school philosophy. The superintendent and the school board are interested in making sure that all faculty members are prepared for the change from a junior high to a middle school.

Site A: Community Setting

Five major groups make up the racial-ethnic groups in Illinois public schools. All of these groups are represented at Site A except Native American. The school is 91.3% White, non-Hispanic. There are 0.4% Black non-Hispanic, and 5.1% Asian/Pacific Islander. Of this population, 3.1% of the students come from low-income families. Low-income students are from families receiving public aid, living in

institutions for neglected or delinquent children, being supported in foster homes with public funds, or eligible to receive free or reduced-price lunches (Section 10-17a of the School Code).

The overall growth and development of the community in which Site A is located is being controlled by the Comprehensive Plan that was first adopted in 1942 and has been amended in 1959, 1979, and 1993. The community celebrated its 100th anniversary in 1990, and continues to control its development according to its individuality of the past.

The community is fortunate to have strong leadership, effective services and planned, manageable growth coupled with good community support. The community provides an environment which makes it a desirable place to live. Because of the planned growth the community is able to spend $8,429 per pupil to educate its children. Site A's community is a place where a strong school is in place. The evidence of this is in the fact that 96.5% of the parents/guardians of the students made at least one contact with the students' teachers during the year.

Site B: Local Setting

Site B can be found in the western suburbs of the City of Chicago. Site B's 623 students have an excellent attendance rate and a low student mobility rate. Its attendance rate is 95% and student mobility was 11.2%. There were no chronic truants. The school also has a Limited-English-Proficient rate of 13.3%. The average class size in the eighth grade was 20.0 students per class. The school's IGAP scores are shown in Table 3.

Table 3
IGAP Scores for 1995-1996

	Reading	Writing	Social Sciences
School	230	27.1	208
District	230	27.1	208
State	238	24.4	246

The faculty is mostly white and female. Hispanics are the only minority group represented, accounting for 2.4% of the staff. Three of the 42 teachers at Site B are male. The faculty has an average of 9.6 years of experience. Forty-five percent of the staff have a master's degree or above. These teachers have a 17.0:1 student to teacher ratio and the district's student to administrator ratio is 207.7:1.

Site B is a preschool-eighth grade facility. It has three classrooms in the first through eighth grades. The time these students spend each day studying the core subjects is roughly the same as the state average. Evidence of this can be seen in Table 4.

Table 4
Time Spent on Core Subjects

	Mathematics	Science	English	Social Studies
School	44	44	88	44
District	44	44	88	44
State	48	44	90	45

Site B: Community Setting

Site B exists in a mostly white and middle class community. White students make up 87.0% of the students with Hispanics being the next largest group making up 10.8%. Asian/Pacific Islanders make up 2.1% of the total. Black students are 0.2% of the enrollment. The Site has a low income population of 9.6%.

Site B is a one school district where 100.0% of the parents made contact with

their children's teachers. The financial health of Site B is better today than it has been in many years. A referendum was passed in April of 1995 which has helped to bring in more funds. In addition, the school is running into a shortage of classroom space. All available classrooms are full. New locker rooms for gym classes also need to be built. In the future there will be an attempt made to pass another referendum to add money to the building fund for expansion. The district currently spends $5056 per pupil.

Site C: Local Setting

Site C is located in Chicago's south side with an enrollment of 649 students in prekindergarten through eighth grade. The average class size is 27.0 students with none of them designated as Limited-English Proficient. While the school fell below the state averages on the IGAP tests, it did rise above the district's averages (see Table 5).

Table 5

IGAP Scores for 1995-1996

	Reading	Writing	Social Sciences
School	204	24.2	208
District	187	22.4	208
State	238	24.4	246

Students at Site C have a pupil to teacher ratio of 20.6:1 and are educated by a teaching staff with an average of 14.5 years teaching experience. Forty-one percent of these teachers have advanced degrees. These students also experience a 357.1:1 student to administrator ratio. The time these students spend each day studying the core subjects is roughly the same as the state average. Evidence of this can be seen in Table 6.

Table 6

Time Spent on Core Subjects

	Mathematics	Science	English	Social Studies
School	53	40	103	40
District	53	40	104	40
State	48	44	90	45

Site C: Community Setting

Site C is 100.0% African American with an 89.7% attendance rate and a 45.7% mobility rate. There is also a large special education population including two trainable mentally handicapped classrooms.

Site C has served multiple generations of families in a major metropolitan city. The neighborhood is home to four major street gangs, one of which is organized nationwide. The community has a 98.0% poverty rate which by definition of the Better Schools Accountability Law (Section 10-17a of the School Code) means that all but 2.0% of these students are living in homes on public aid, are living in foster homes, are living in institutions for neglected or delinquent children and receive free or reduced lunches. Eighty-two percent of these students' parents made contact with a teacher in the 1995-1996 school year while the school spent $6,941 per student.

IGAP test results indicate that the percentage of students at Site C who did not meet the state standards were 51% in 1993, 55% in 1994 and 57% in 1995. Due to the consistent decline in IGAP scores the school was placed on remediation in September of 1996. That same school year (February 1996) the Board of Education sent a team from the Department of School Intervention to observe Site C. On the basis of this one day visit the team observed that there seemed to be an inadequate communication that could prevent a school wide focus. They further noted that all classes should strive toward the same quality of instruction as was demonstrated in some exemplary classrooms. The team indicated that priority should be given to

improving the quality of education in the special education department. Concern was also expressed by the team on the high incidence of theft and vandalism at Site C.

The March 1996 IGAP scores for Site C improved and the results were challenged by the Board of Education in November of 1996. Site C has been accused of cheating on both the IGAP and IOWA tests for the 1995-1996 school year by the city Board of Education. Since that time, the Office of Investigations for the city Board of Education has been conducting a large scale, in depth investigation of the testing procedures for both the IGAP and IOWA test practices at Site C. Teachers, staff and students have been interviewed by the Office of Investigations. In May of 1997, the Board of Education found that the accusations of cheating on IGAP and IOWA tests were unfounded.

The 1996-1997 school finds Site C in its second year of remediation with the possibility of being placed on probation. Teacher morale is low due to loss of respect and credibility from students, parents, the community at large, and the Board of Education.

Site D: Local Setting

Site D consists of 707 students in sixth, seventh, and eighth grade, with 6.2% of these students considered Limited-English-Proficient. The average class size is 21.9 students. During the 1995-1996 school year, the eighth grade students consistently scored higher on the IGAPs than the state average in reading and writing, while the seventh grade students outscored the state average in Social Science (see Table 7).

Table 7

IGAP Scores for 1995-1996

	Reading	Writing	Social Sciences
School	278	25.8	302
District	262	25.8	263
State	238	24.4	246

These students work in an environment with a 17.2:1 student to teacher ratio. These teachers average 12.6 years teaching experience and 56.9% of them have a master's degree or higher. The student to administrator ratio is 267.9:1. The time spent on each subject is listed in Table 8.

Table 8

Time Spent on Core Subjects

	Mathematics	Science	English	Social Studies
School	40	40	80	40
District	40	40	80	40
State	48	44	90	45

During the 1995-1996 school year, the school underwent part of a district-wide construction project. Additions to the building included: a front entrance, a library with a central media distribution center and computer lab, a central office, a teacher's lounge, and a field house (partially paid for by the park district for their own use). The existing office, library, and computer lab were converted into additional classrooms and a large group instruction area, big enough for roughly 150 students using folding chairs. In addition, the existing technology lab was updated, while every classroom got a telephone and 25 inch color television connected to the library's central media distribution center.

In addition to the facility's changes, the school's faculty also underwent changes. In the spring of 1992, when the school was still called a junior high, eight teachers received six week's paid release time to develop a new seventh grade curriculum that reflected the middle school concept. During the 1993-1994 and 1994-1995 school years, the new seventh grade plan was adopted by one of the school's two seventh grade teams. In the fall of 1995, a new middle school was reopened, as described by the district's construction plan. This new school was designed to fit the

definition of a middle school as closely as possible. Consequently, almost all of the teachers actively practicing the middle school concept went to the newly reopened school, leaving Site D with mostly junior high oriented teachers. While both philosophies have their merits, the split has made each side's beliefs in their opinions stronger. There are, of course, a few teachers in the middle who employ the strategies of both philosophies.

Site D: Community Setting

The school's 707 students are predominantly white(90.2%) with a small percentage of minorities: 1.3% African-American, 2.8% Hispanic-American, and 5.7% Asian/Pacific Islander. Three point eight percent of the students are considered low-income.

At this point in time, one of the biggest issues in the district's community is the transition from a junior high philosophy to a middle school philosophy. With 100% of the district's parents making at least one contact with teachers during the 1995-1996 school year, it is easy to see that this community has characteristically active parents. The parents who are opposed to the transition are vocal with their concerns about whether or not the middle school concept adequately teaches their children the necessary skills for academic success once they reach high school. The district has responded by instituting a district dialogue which is designed to increase administrator-teacher-parent communication about curriculum. This dialogue appears to have increased the community's confidence that their $6,379 per student is money well spent.

National Context of the Problem

Students need help in acquiring strategic reading skills needed to cope with the ever expanding demands and changes in the marketplace. Literacy must be a top priority and reading skills must be a key component across the curriculum. Different modalities for teaching reading comprehension must be explored, for research

suggests that low reading achievers can benefit from strategy instruction (Lapp & Flood, 1986), because these learners need strategies to help them understand what they read.

In her book, Textbooks and the Students Who Can't Read Them, Ciborowski points out what many teachers have seen first hand about school age readers: students who have low content area comprehension seldom experience success in their reading, and therefore are less motivated to do ensuing reading assignments (1992). A series of low comprehension experiences can lead to a compounding effect where a student does poorly on a current assignment, thereby reducing the chances that the student will be successful on future assignments. As a result, a student can feel as if he/she is less intelligent than his/her peers when the reality of the situation is that the student simply does not have the necessary reading strategies, or is not strong in that particular area of intelligence. Fortunately, "intelligence is not fixed or static; intelligence can be learned and taught"(Lazear, 1992, p. 109), so these problems can be addressed by a classroom reading or content area teacher.

CHAPTER 2

PROBLEM DOCUMENTATION

Problem Evidence

A common perception of many content area teachers is that their students have a difficult time comprehending their text books. This is easily illustrated by the fact that some content area teachers spend the first few weeks of the school year teaching their students how to comprehend, question, and take notes on their respective textbooks. Some content area teachers have even taken time out of their schedules to have reading/curriculum specialists teach the students reading strategies. While anecdotal data abounds, there is also numerical data indicating that this problem exists as well.

Data indicating the decline of reading scores in the middle grade levels was found in two places: the IGAP test scores, and a reading comprehension test prepared by a textbook publishing company. State averages on the IGAP tests have shown a steady decline over the last three years, and while each site has shown improvement from year to year, longer term comparisons of the sites' test scores (comparing 1994 scores to 1997 scores) have shown a decline in reading comprehension. An underlined score indicates a decline in average score (see Table 9).

In addition to these IGAP reading scores, a seventh grade level reading comprehension test was given at each of the sites. On a 20 question test, the average scores for each of the sites are as follows: Site A, 11.85 (59.25%); Site B, 11.50 (57.50%); Site C, 11.67 (58.33%); and Site D, 14.13 (70.63%). When viewing this information, it is important to keep in mind that Site A involves sixth grade students, Site B involves seventh grade students, and Sites C and D involve eighth grade

students. This test was found to be particularly helpful because very few students earned a perfect score, indicating that there will be room for measurable improvement.

Table 9

Eighth Grade IGAP Reading Scores From 1994 to 1997

SITE	1994	1995	1996	1997
A	295	292	271	282
B	257	268	230	232
C	n/a	n/a	n/a	170
D	284	290	278	259
State	260	246	238	227

Probable Cause (Site Based)

The interesting point here is that while only Sites A and D seem to be socio-economically similar, all four sites' reading comprehension problems stem from the same central issue: little to no "outside reading" is being done on the part of the students. "Outside reading" is defined as reading which was not specifically assigned for academic course work. While each of the sites suffer from a lack of outside reading, the causes of this issue vary from site to site.

The lack of outside reading for Sites A and D stem from a general trend of over-involvement in extra-curricular activities. A good number of students are involved in music lessons, one or more sports, and religious classes. In addition, the presence of technology in the homes (i.e. computer gaming, internet access, and television) can take up a disproportionate amount of time in a student's day.

As for Site B, a lack of outside reading stems from some of the same extra-curricular involvement, plus a lack of modeling of outside reading. Site C suffers from the same absence of modeling. In addition, certain environmental issues are present at Site C. A lack of a stable home environment plus a 98% poverty rate lead to a pessimistic view of the future, hence the students see no value in the enhancement of

skills that will lead to a brighter future. To compound the problem, many of Site C's students are unfamiliar with Standard English. In addition to these causes for the problem of poor reading comprehension, other causes are abundant in current literature.

Probable Cause (Literature Based)

One of the major causes of low reading comprehension in the content areas is the fact that when students first learn to read in elementary school, the reading materials are primarily narrative in form. In the intermediate grades, when the reading material makes the transition from a narrative format to an expository format, students do not receive the necessary instruction for comprehending this different writing style (Ciborowski, 1992). To make matters worse, any reading difficulties that a child experiences while learning to read have a tendency to compound until they begin to negatively affect that child's ability to manage conceptually dense material such as the expository text found in content area textbooks (Ciborowski, 1992). The lack of expository reading strategies added to a student's compounded developmental reading difficulties has the potential to make a student's views on reading turn negative. Ciborowski (1992) enforces this notion when she points out that students appear beaten down by the feelings of defeat after years of frustration and failure in reading. They are unable to decipher the difference between understanding and confusion. Conversely, a skilled reader varies reading strategies to fit the text; yet students are seldom assessed in how they vary the strategies they use to understand what they read (Cochran, 1993).

The problem of content area reading lies not only in the students' skills or lack thereof, but also in the way the textbooks are assembled. The organization of textbooks make them difficult to read. Texts can be illogically sequenced, may include irrelevant information, may not be written with the background of the audience in mind, sometimes do not use supporting internal aids (headings, graphics, etc.), and have a

tendency to present information without using clear organizational patterns (Ciborowski, 1992; Cooter & Flynt, 1996). In addition to this murky style of writing, content teachers have resisted working on reading instruction because they believe reading instruction is not their responsibility (Ciborowski, 1992).

There are a great number of reasons why students have low comprehension. At the sites in question, reading must compete with other activities for a student's time. Across the nation, students suffer from the short comings of current teaching methods whereby their problems compound. To top it off, students are required to read expository textbooks that do not always follow some form of logical organization. With this in mind, teachers need to look for some solutions to these problems.

CHAPTER 3

THE SOLUTION STRATEGY

Literature Review

In order to approach this project in the most intelligent manner, one must understand many different educational topics. A review of intelligence and the work of Howard Gardner is the most logical starting point. In addition, it is important to understand the basics of reading, especially the problems with reading development and strategies to combat these problems. Finally, a study of graphic organizers and how they relate to reading will aid in the understanding of this study.

Intelligence

Alfred Binet first established the theory that intelligence is fixed. Binet defined a fixed intelligence as the ability to use language and to perform mathematical calculations (Chapman, 1993). Ever since Binet's theory, human intelligence and how people learn have been a source of great controversy.

Later, Reuven Feuerstein, Jacob Rand and associates (as cited by Chapman, 1993) disproved the notion of fixed intelligence. They pioneered the work on modifying or improving the cognitive process through mediation. Feuerstein pointed that in order for mediation to occur, two important conditions must be met. First, conditions helpful in the development of the cognitive processes must be created. Second, conditions that hinder progress must be removed.

Gardner then developed the theory of multiple intelligences. He argues for several relatively independent intellectual abilities he calls "frames of mind" by which all people are capable of seven different ways of acquiring knowledge (Gardner,

1983).

Gardner defined intelligences as intellectual competencies that entail a set of skills for problem solving and entail laying the groundwork for acquiring new knowledge later (Chapman, 1993). There are many misconceptions about intelligences. According to Gardner (1983), two of these misconceptions are that intelligence is fixed and that there is only one intelligence.

Intelligences are relatively independent of each other. Because intelligences function together, their autonomy is sometimes obscured (Gardner, 1983). Intelligences are the result of cultural forces. Intellectual competencies never develop in isolation (Gardner, 1983). The ideal of what is valued varies from culture to culture. Sometimes intelligences are of little importances in some cultures and are greatly valued in others. Because of cultural influences, some intelligences develop strongly while others hardly develop at all. Our educational system is heavily dependent on verbal/linguistic methods of instruction and assessment (Gardner, 1991). Gardner believes that each person is born with all of the intelligences (Gardner as cited by Chapman, 1993). People are a unique combination of the intelligences (Chapman, 1993). Where people differ is in the strengths and weaknesses of the various intelligences.

Each intelligence is modifiable. There are a variety of factors that can cause an intelligence to expand or regress. These factors are environmental and experiential. If proper stimulation is not supplied, the desired development will not occur (Gardner, 1983). Although each person's capacity to learn is different, intelligences can be grown and taught (Chapman, 1993).

Gardner identified three categories of intelligence: language related, personality related and object related (Chapman, 1993). There are two types of language related intelligences, verbal/linguistic and musical/rhythmic. The personal forms of intelligence are intrapersonal and interpersonal. Object related forms of

intelligence are bodily/kinesthetic, visual/spatial and logical/mathematical. These "seven ways of knowing" are the multiple intelligences.

The mediation of an intelligence is the process of helping a student think aloud about a task and how it can be accomplished. Mediation occurs when a teacher helps a student think about what and how he is learning and how to apply what he has learned from his experience (Chapman, 1993).

How do these theories of multiple and modifiable intelligences impact teaching for understanding in the content areas? Gardner defines understanding as the ability to use current knowledge, concepts or skills to solve new problems (Gardner, 1994). Disciplinary competence is difficult to achieve. Powerful "predisciplinary" ways of knowing make disciplinary mastery difficult. Fortunately, Gardner has already examined the ramifications of some of these shortcomings.

Intelligences and Content Curriculum

Gardner has several criticisms for content curricula. He calls for thematic or interdisciplinary units of curricula. Current methods of organizing curricula are outmoded ways of organizing knowledge. Gardner calls for replacing them with ways of knowing or learning styles. Gardner contends that shifting definitions of disciplines have made disciplines obsolete (Gardner, 1994).

By using multiple intelligences in the content disciplines, Gardner contends that not only are the opportunities of acquiring knowledge, but the way students define understanding will be expanded. Genuine understanding will be most likely to emerge if students possess a number of different ways of representing knowledge and are allowed to move back and forth amongst the different ways of knowing (Gardner, 1991).

Using the multiple intelligences to teach content maximizes learning opportunities for all students (Gardner, 1995). Curricula should use a range of disciplinary and interdisciplinary areas of study. Multiple means of assessments

allows each student to exhibit what he knows or has learned (Gardner, 1995).

Can intelligences actually be modified? Not everyone agrees they can be. Morgan says that Gardner's intelligences are actually more realistically defined as "cognitive styles" (Morgan, 1996). Cognitive style research is not new. It was pioneered in the 1950's. Cognitive styles are differences in the ways individuals organize and process information and experiences.

These styles are consistencies people develop in cognition. They are stable attitudes, preferences, or habits determining a person's method of perceiving, remembering, thinking, and problem solving. These preferences apply to almost all human activities including social and interpersonal functions (Morgan, 1996). The cognitive styles are visual/figural, motoric, and auditory/verbal. As you can see, Gardner's intelligences can be paired up with the cognitive styles.

The cognitive styles reinforce and clarify information from one another. People receive information from one another. People receive information from different sources and process it in different ways. These do not qualify as intelligences (Morgan, 1996).

Moreover, the modifiability of cognitive styles is limited. Developmental changes in human growth are systematic and depend on developments occurring in earlier stages. These stages of development are influenced by internal forces rather than by environment and experiences through environment (Morgan, 1996). Can intellilgences or congitive styles be modified? We have chosen the visual/spatial intelligence with which to experiment.

Visual/Spatial Intelligence

Gardner (1983) defines the visual/spatial intelligence as a sharpening of the sensimotor perceptions of the world around us. Students using their visual/spatial intelligence transfer images in their minds to a new object. They mix perceptions with prior knowledge and experiences and create new images for others (Chapman, 1993).

The visual/spatial intelligence is a vitally important skill for life in the modern world. Visual/spatial intelligence, used to produce and comprehend images, becomes more and more important as the telecommunications and computer industries expand. The visual/spatial intelligence will become increasingly important to economic development and growth (Smagorinsky, 1995).

Graphic organizers are excellent for the development of visual/spatial intelligence. Concept maps and right angle maps help students organize their thoughts and see connections and relationships (Chapman, 1993). The development of this intelligence should benefit reading comprehension because reading comprehension is a complex activity.

Reading and Comprehension

Reading and reading comprehension and how to improve it, is a major concern for most teachers today. Research has shown teachers how students read and comprehend and has offered suggestions on how teachers can aid their students to improve comprehension. Comprehension is an active process in which students integrate what is being read with knowledge that they already have about the subject.

Reading is one of the four language arts: listening, speaking, writing and reading (Cooper, Warncke, & Shipman, 1988) Speaking and writing are the expressive areas of language arts, while listening and reading are the receptive areas of language arts. Teachers should relate these four areas in the instructional programs in the content areas as much as possible because they are closely related to each other (Cooper, Warncke, & Shipman, 1988). Reading does not occur unless comprehension takes place. Therefore, reading is comprehension or developing understanding (Cooper, Warncke, & Shipman, 1988). Just because a student is able to decode the words in any given passage does not mean that they are reading.

Exactly what is reading? Reading is a process of constructing or developing meaning from printed text. To do this, the reader brings prior knowledge or experience

to the text. The clues in the text trigger the reader's experience relative to the topic. The reader uses clues from the text in combination with prior knowledge to form meaning; the use of these two elements together is the interaction between the reader and the text (Cooper, Warncke, & Shipman, 1988).

What then, is comprehension? Since reading is comprehension, the definition of comprehension begins with the definition of reading and expands on that. Comprehension can be seen as the process of using one's own prior experiences and the writer's cues to infer the author's intended meaning. This process can involve understanding and selectively recalling ideas in individual sentences, inferring relationships between clauses and/or sentences, organizing ideas around summarizing ideas, and making inferences not necessarily intended by the author. These processes work together and can be controlled and adjusted by the reader as required by the reader's goals and the total situation in which comprehension is taking place (Irwin, 1986).

During the reading process the reader is continuously using clues and information provided by the text to draw from their schemata to construct meaning for what is read. Readers perform the tasks of decoding and comprehension together as they read different texts (Cooper, Warncke, & Shipman 1988).

Types of Texts

There are two basic types of text: narrative and expository. Narrative text presents information by telling a story. Expository texts present facts and information in many ways, depending on the type of information being presented and the purpose for presenting it (Cooper, Warncke, & Shipman, 1988). It is very difficult for students to understand and learn from expository text. Research by Calfee and Curley (1984), state that reading instruction in elementary grades focuses on the narrative. Students are taught and learn both types of text material. However, learning to read narrative text does not mean that it will transfer to expository text. Fourth and fifth graders

experience difficulty in making the transition from narrative to expository text (Boothby, & Alverman, 1984). Reading expository text is difficult for students for two reasons: (a) students have much more experience in reading narrative texts and are familiar with the elements of a narrative, and (b) expository texts do not follow one consistent pattern as do narratives, and authors use several different patterns within the same text. Therefore, learning to comprehend expository texts requires focusing on several different text patterns at the same time(Cooper, Warncke, & Shipman, 1988).

There are four different types of expository writing: (a) description - gives information about a particular topic; something is described, (b) collection (sequence or listing) - ideas are presented together as a related group ; often called listing or sequence, (c) causation or cause-effect - ideas are presented to show that cause-effect can be stated or implied, and (d) comparison - the likenesses and differences between two or more objects or ideas are presented (Cooper, Warncke, & Shipman, 1988). A dominant feature of content-area instruction is the reliance on expository text as the principal medium used to "teach" students (Allington, 1980; Schallert & Tierney, 1982). Taking these four types of expository writing into consideration, research show us that using knowledge of text structure as a teaching and learning strategy helps students comprehend content areas texts (Piccolo, 1987). So one of the goals for teaching reading of expository material is to teach students the strategies for learning by reading the text.

Strategies for Reading Text

In order to begin helping students with reading and comprehension, teachers must teach the students the difference between text structure and content. Teachers' first objective is to show students that the content of a passage consists of its ideas, facts, and information, while the structure is the scheme by which the content is organized (McGee & Richgels, 1985). Students who possess sufficient prior knowledge of the content, exhibit adequate word recognition and vocabulary skills,

and are "textwise" may find learning content-area expository prose a manageable task (Simmons, Griffin & Kameenui, 1988). What happens to the students that do not possess those skills? These students experience significant difficulty when confronted with the "unenviable task" of learning form content-area texts (Allington, 1984). Expository texts also present a serious challenge for teachers faced with the task of making content-area information more accessible and comprehensible for the learner (Simmons, Griffin & Kameenui, 1988).

There is no reason the majority of middle level students can't comprehend the texts they are asked to read if teachers first prepare students for learning, provide appropriate support during reading, and help students extend and apply what they've read to situations outside the text (Vacca & Vacca, 1989). Reading instruction in the intermediate grades should emphasize: (a) refining basic reading skills, (b) extending comprehension skills, (c) expanding reference study skills, (d) strengthening metacognitive strategies, and (e) exploring specific content area materials in order to extend concepts and to clarify generalizations (Lapp & Flood, 1986). How can teachers accomplish these tasks? Four different experts agree that graphics are a way of helping students learn and recall material. Graphics can help students understand concepts and facts presented in the text (Lapp & Flood, 1986). Ideas are connected and retained in memory more effectively if they are organized around an overall organizational pattern (Irwin, 1986) For expository texts, a graphic organizer that illustrates how the major concepts are related to one another can be shared and discussed with students. Then, ask students to use this overview as a guide for note taking, directing them to add important pieces of information to the overview as they discover information during their reading (Thompson, 1993). Graphic techniques are special representations of structural knowledge in the content area (Beissner, 1993).

Graphic Organizers

The experts mentioned above made reference to graphic organizers. What are

graphic organizers? The graphic organizer, originally called a structured overview, was developed as an attempt to translate Auseubel's (1968) cognitive theory (as cited by Griffin, Malone, & Kameenui, 1995). Graphic organizers, as they are now called, are a visual strategy for organizing concepts and how they are related. Sometimes terms like story map, web or Venn diagram are used in place of the inclusive term graphic organizer.

Graphic organizers can be constructed before, during , or after content material is read. The organizers can be constructed by the teacher, the text book company, individual students, or by a cooperative group of students. When students use or create graphic organizers, they see labels organized spatially to depict the organization of concepts and their relationships to each other (Irwin-DeVitis & Pease, 1995).

Graphic organizer instruction is one strategy which can be taught to intermediate grade students to assist with content area reading (Boothby & Alvermann, 1984). Graphic organizers are instructional strategies that are used to help students better understand their reading using spatial arrangements and wording to organize concepts (Pruitt, 1993). Research indicates that graphic organizers can help intermediate level students learn from expository text.

Boothby and Alvermann (1984) did a study on fourth graders. They were taught graphic organizers to help them remember what was read in their social studies text books. Those students in the experimental group who completed the graphic organizers had better recall after 48 hours than the control group who did not complete the graphic organizers. Graphic organizers help students sort through much information and distinguish between superordinate and subordinate ideas. It also helps them organize this information in such a way that they can remember not only the details, but also the relationship of these details to each other (Thompson, 1993). This strategy is beneficial in helping students learn from expository material.

Simmons, Griffin and Kameenui (1988), completed a study on sixth grade science students. They found that prereading graphic organizers were the most effective in enhancing delayed recall in their study. This is contrary to the study done by Moore and Readence (1980 and 1984) that found that graphic organizers were most effective in the post reading position.

Researchers agree that graphic or visual organizers reflect patterns of thinking about content knowledge; they allow teachers to focus students attention on higher order thinking skills without shifting attention from subject area content. Content area teachers can use visual organizers in the classroom to clarify the purposes and the thinking processes that make learning meaningful (Clarke, 1990; Jones, Pierce, & Hunter, 1989).

Following this idea by Clarke (1990), Simmons,Griffin and Kameenui (1988) did a study on graphic organizer instruction on fifth grade students. They concluded that not only the graphic organizer was important, but the graphic organizer instruction as well. This observation led to the conclusion that complementing graphic organizer instruction with and instructional adjunct, whether it be with verbal rehearsal, summarization training (Bean et al., 1986), or explicit instruction, may be an important factor in the design of graphic organizer instruction and deserve further study (Simons,Griffin, & Kameenui, 1988).

Research has shown that the use of graphic organizers is effective in aiding students' ability to comprehend expository text material. With proper planning and instruction by teachers, graphic organizing can be taught. The question is, how will graphic organizers affect the non-visual child? Is graphic organizing a skill that can be taught to children that do not exhibit that intelligence according to Howard Gardner's Theory of Multiple Intelligences? This research project attempts to answer these questions.

Project Objectives and Processes

1. As a result of the use of graphic organizers during the period of September through October 1997, the visually/spatially talented learners will increase reading comprehension in the content area as measured by pretest and post tests.
2. As a result of the use of graphic organizers during the period of September through October 1997, the visually/spatially challenged learners will increase reading comprehension in the content area as measured by pretest and post tests.
3. As a result of the use of graphic organizers during the period of September through October 1997, all students will increase positive attitudes toward reading in the content area as measured by the student interviews.

In order to accomplish the terminal objective, the following processes are necessary:

1. Determine the A group (visually/spatially strong), the B group (visually/spatially average), and the C group (students that show challenged visual/spatial intelligence) through the use of a multiple intelligences "Reading Inventory".
2. A pretest to determine comprehension in the content area.
3. Lesson plans for four different graphic organizers.
4. Reading selections for teaching each of the aforementioned graphic organizers.
5. Review lesson of the graphic organizers.
6. A post test to determine the increase in reading comprehension.
7. Intermediate student interviews to determine attitude toward the graphic organizers and reading (to be given after the second lesson and before the third lesson).
8. Final student interviews to determine attitude toward the graphic organizers and reading (to be given after the post test).
9. A reading survey to determine whether or not the students retained and utilized the graphic organizers.

Project Plan of Action

I. (9-3-97) Administer multiple Intelligence inventory to all students (see Appendix

A).

II. Formulate A, B, and C groups from results of multiple intelligence inventory.

A. A Group-students who are visually/spatially talented.

B. B Group-students who are visually/spatially average.

C. C Group-students who show visually/spatially challenged intelligence.

III. (9-10-97) Pretest for reading comprehension in the content area.

A. Standardized Reading comprehension test used.

B. Will be taken by all students.

IV. Graphic organizer lessons to all students (see Appendix B for complete lesson plans).

A. (9-17-97) Graphic organizer #1-fishbone.

B. (9-24-97) Graphic organizer #2-concept map.

C. (10-1-97) Graphic organizer #3-information chart.

D. (10-8-97) Graphic organizer #4-sequence chart.

E. (10-15-97)Review of graphic organizer numbers 1-4.

V. (10-22-97) Post test

A. Standardized Reading comprehension test used.

B. Will be taken by all students.

VI. Subdivide A, B, and C groups into 1, 2, and 3 subgroups.

A. A1 group is the visually/spatially talented students who showed increased comprehension.

B. A2 group is the visually/spatially talented students who showed no change in comprehension.

C. A3 group is the visually/spatially talented students who showed decreased comprehension.

D. B1 group is the visually/spatially average students who showed increased comprehension.

E. B2 group is the visually/spatially average students who showed no change in comprehension.

F. B3 group is the visually/spatially average students who showed decreased comprehension.

G. C1 group is the visually/spatially challenged students who showed increased comprehension.

H. C2 group is the visually/spatially challenged students who showed no change in comprehension.

I. C3 group is the visually/spatially challenged students who showed decreased comprehension.

VII. (9-25-97 to 9-30-97 and 10-23-97 to 10-29-97) Student interviews (see Appendix C for questons included in interviews).

A. Two most visually/spatially talented students at each site will be interviewed.

B. Two most visually/spatially challenged students at each site will be interviewed.

VIII. (11-19-97) Reading styles survey (see Appendix D).

A. Check for retention and utilization of material taught.

B. Taken by all students.

See Figure 1 for flow chart representing action plan.

Methods of Assessment

In order to assess the effects of the intervention, a pretest and post test of reading comprehension in a content area will be employed. In addition, a multiple intelligences inventory will be used to divide the students into Groups A, B, and C (Group A: visually/spatially talented students, Group B: visually/spatially challenged students, Group C: visually/spatially average students) along with student interview at two separate intervals. Finally, a reading style survey will be given after the post test.

ACTION PLAN

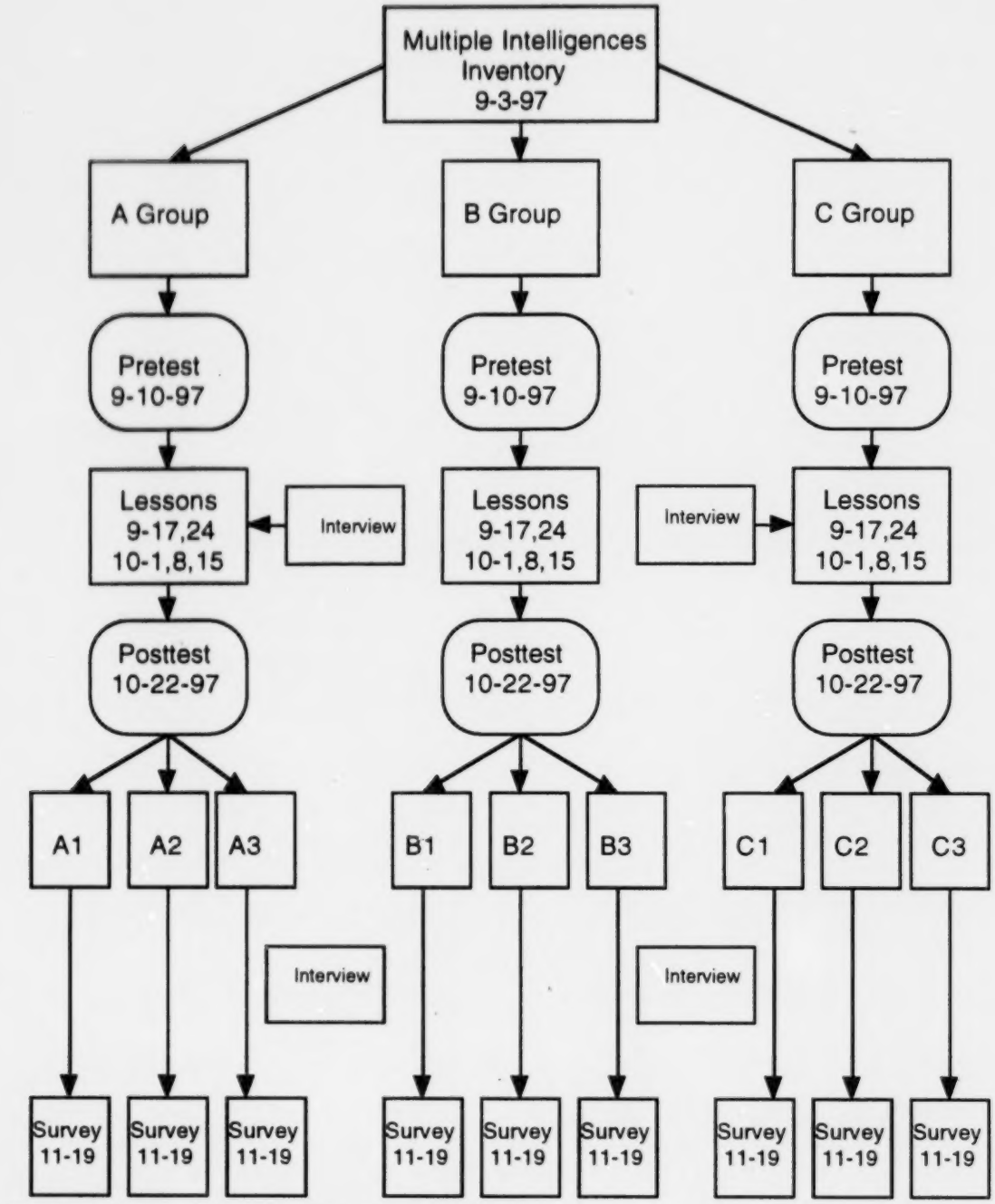


Figure 1: Flow Chart Representing Action Plan

CHAPTER 4

PROJECT RESULTS

Historical Description of the Intervention

The objective of this project was to increase the reading comprehension of all students, both visual/spatially talented and challenged, through the use of graphic organizers. The intervention entailed the teaching of four different graphic organizers and a review session before students were given a post test for reading comprehension.

The first thing the students did was take a multiple intelligence inventory. As noted earlier, this inventory had 10 visual/spatial statements out of a total of 25. From these inventories, the students were broken into the three visual/spatial categories. The visually-spatially strong group consisted of all students who positively answered 7 to 10 visual/spatial statements. A total of 30 students comprised this group. The visually-spatially average group consisted of those students who positively answered five to six visual/spatial statements. A total of 33 students comprised this group. The visually-spatially challenged group consisted of the remaining students who positively answered zero to four statements. This group was comprised of 32 students.

As a means of measuring improvement, or the lack thereof, the students took a published reading comprehension test from the 1997 McDougal Littell Seventh Grade Reading Series. These results were used to determine a baseline score for each student. Class averages as well as an overall average were computed from these scores.

Four graphic organizers were taught in order to increase reading comprehension. First, the students learned the fish bone (Bellanca, 1990), then the concept map (Bellanca, 1990), followed by the information chart (Bellanca, 1992), and finally the sequence chart (Bellanca, 1990). Each of these graphic organizers were taught through the same process. First they were presented and explained. Then, working as a class, the organizers were modeled using high interest, well-known topics and brainstorming. Then the students were given a reading passage which was used for guided practice. Finally, the students completed an individual application of the graphic organizer using an additional reading passage. The reading passages were selected from the McDougal Littell series and Silver Burdette series. These four lessons were followed up with a comprehensive review of all four organizers.

In order to compare the pre and post tests scores, the same reading comprehension test was used. Upon completion of the teaching, practice, and review of the graphic organizers, the students were given an opportunity to use the graphic organizer(s) of their choice to construct meaning of the comprehension pretest reading passages. These organizers were then used to aid the students on the comprehension post-test.

Using a comparison of the pre and post test scores, each category of students (groups visually/spatially strong, visually spatially average, and visually/spatially challenged) was broken into three more groups, for a total of nine groups. Each visual/spatial category was divided into three groups: those who showed improvement in reading comprehension, those who showed no change in comprehension, and those who showed a decline in comprehension.

One month after the post test, all students completed a teacher constructed reading survey. This survey had three purposes. First, it was designed to encourage the students to reflect on their experiences with the graphic organizers. In addition it

evaluated the retention of the organizers. Finally, it facilitated the transfer of the organizers' applications to other content areas.

Interviews were conducted after the second lesson, and after the post test. The students interviewed were the two most visually-spatially talented students and the two least visual/spatially talented students at each site, for a total of 16 students. These interviews were designed to find out if, in fact, the students knew what the organizers were all about and if the students used the organizers in other classes. The data has been broken down into information regarding the multiple intelligences inventory, reading comprehension tests, and the reading style survey.

Presentation and Analysis of Results

The effect of the graphic organizers on reading comprehension in the content areas was assessed by readministering the McDougal Littell reading comprehension test, the student interviews, and the teacher created student reading survey. The data collected is organized according to the assessment tool and the group assessed.

Results of Multiple Intelligence Inventory

Figure 2, shows the results of the multiple intelligences survey. The graph shows that the students were roughly divided into thirds with each group deviating less than 1.8% from 33.3% of the whole, regardless of the fact that the students came from a variety of socioeconomic backgrounds. Each group took the reading comprehension pre and post tests.

Reading Comprehension and Pre and Post Test Results

Figure 3 displays the results of the reading comprehension pre test and reading comprehension post test. The results of the pretest indicate that regardless of the students' visual/spatial abilities, the scores were nearly identical with less than one point separating the highest group average score and the lowest group average score. The results of the post test indicate that, once again, regardless of the students's

visual/spatial abilities, the scores were nearly identical with less than one point separating the highest group average and the lowest group average. One interesting point arises when comparing the data contained in this chart: the visually-spatially challenged group has shown the greatest overall increase in average test scores.

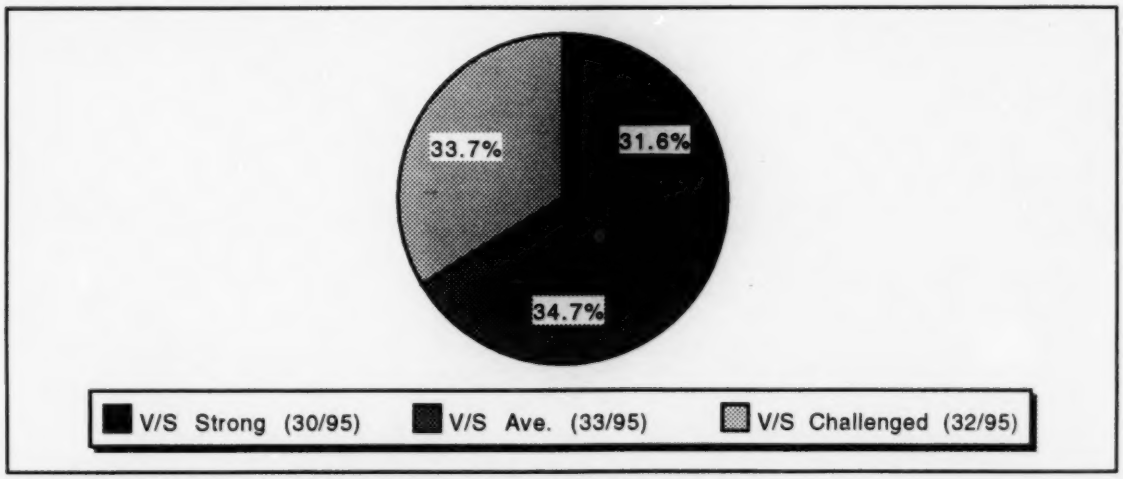


Figure 2. Division of all students into visual/spatial groups.

Figure 4 contains the averages of the pretest and post test broken down into visual/spatial groups and achievement groups. It is important to note that while the scores of some students dropped, these students tended to have the highest pretest scores. Note that the subjects are divided into nine groups. First, they are divided by visual/spatial groups, then within each group, they are divided into groups where students increased their scores (INC.), showed no change in their scores (NO CHANGE), and decreased their scores (DEC.).

Upon closer examination of each of the individual groups, the results show that it did not make a difference whether the student was visually-spatially strong, visually-spatially average, or visually-spatially challenged: all students benefited from learning to use graphic organizers to increase reading comprehension. The average score for each visual/spatial group increased. Figures 5,6, and 7 each point out that a the majority of each visual/spatial group showed an increase in test score. More than 60%

of students for each visual/spatial group showed an increase in pre to post test. In addition, approximately 30% or less of students for each visual/spatial group showed a decrease in pre to post test scores.

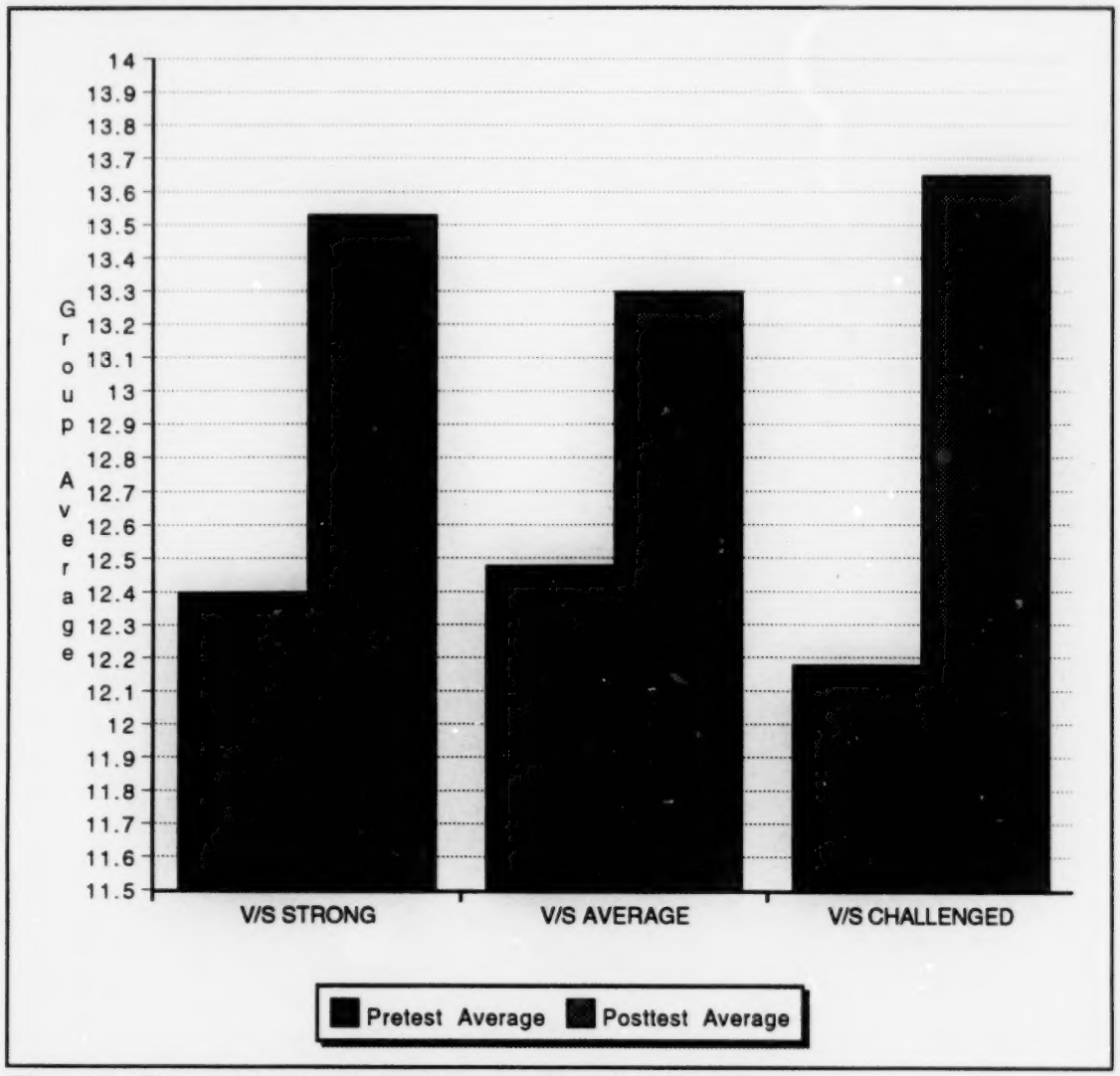


Figure 3. Pre and post test averages by visual/spatial group.

Figure 4 pointed out how the average each improvement group changed, but it does not give any indication as to how many students fell into each improvement group. As Figure 8 shows, the majority of all the students involved showed

improvement in the post test scores, a small number of these students showed no change, one quarter of the student scored decreased. Figures 9,10 and 11 show the break down of each performance group into visual/spatial groups. Figure 9 shows that the percentage of students whose scores increased was equally distributed among the three visual/spatial groups. Figure 10 shows a difference between the three groups. Of the students who showed no change in test scores, almost half of these students are from the visually-spatially strong group, one quarter are from the visually-spatially average group, and one third are from the visually-spatially challenged group. Figure 10 also points out some differences between the three groups. Of the students who showed a decrease in scores, one quarter are from the visually-spatially strong group, just less than half are from the visually-spatially average group, and one third are from the visually-spatially challenged group. While this information shows that the majority of students in all of the visual/spatial groups showed improvement, it does not tell about the students' abilities to retain and apply the visual organizers.

Results of the Reading Styles Survey

Figures 12 and 13 show the results of the reading styles survey. Figure 12 shows that the majority of the students in all groups were able to recognize all four of the graphic organizers taught. Figure 13 shows that almost half of the students from all groups could successfully create all four of the graphic organizers taught. In addition to this information, the students had a chance to express their thoughts about the graphic organizers through the use of student interviews.

Student Interviews

The last form of data collection used was student interviews. They had limited usefulness because the students were unable, or reluctant to explain their answers. The students indicated that they would use graphic organizers if the teacher provided them with the structure for the graphic organizer in question. They were reluctant to

create the organizers of their own.

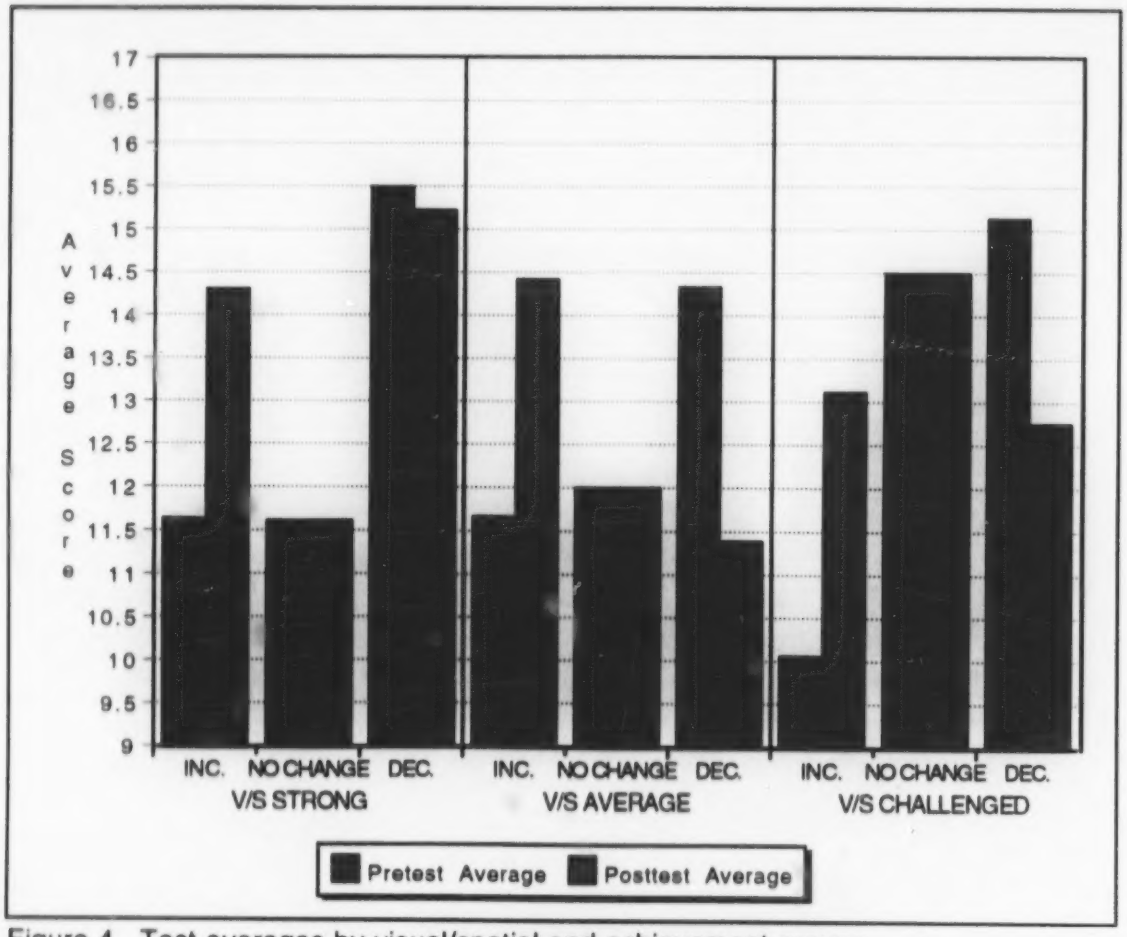


Figure 4. Test averages by visual/spatial and achievement groups.

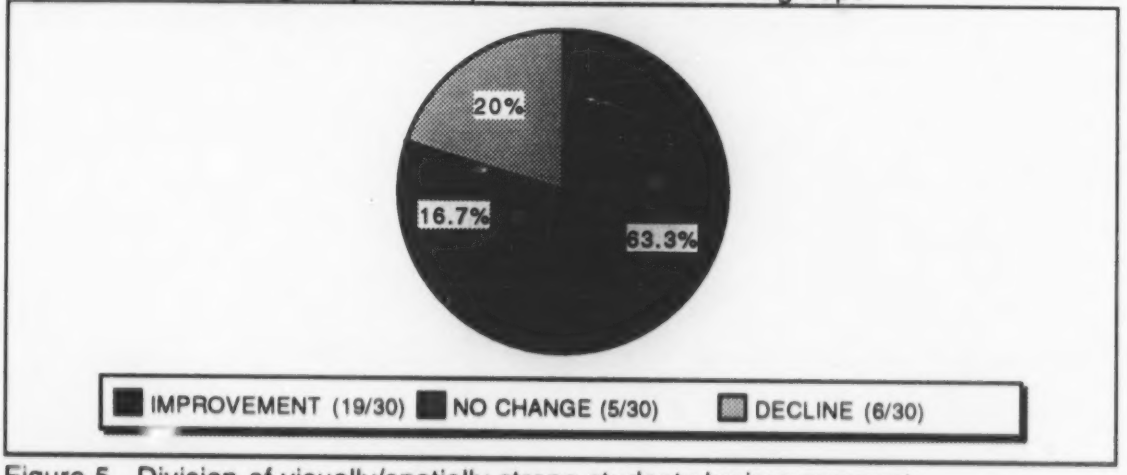


Figure 5. Division of visually/spatially strong students by improvement.

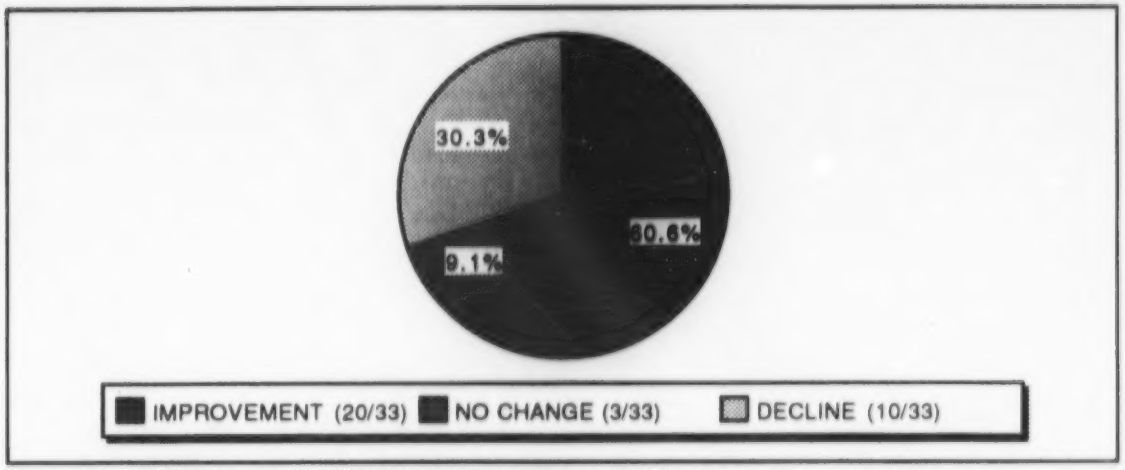


Figure 6. Division of visually/spatially average students by improvement.

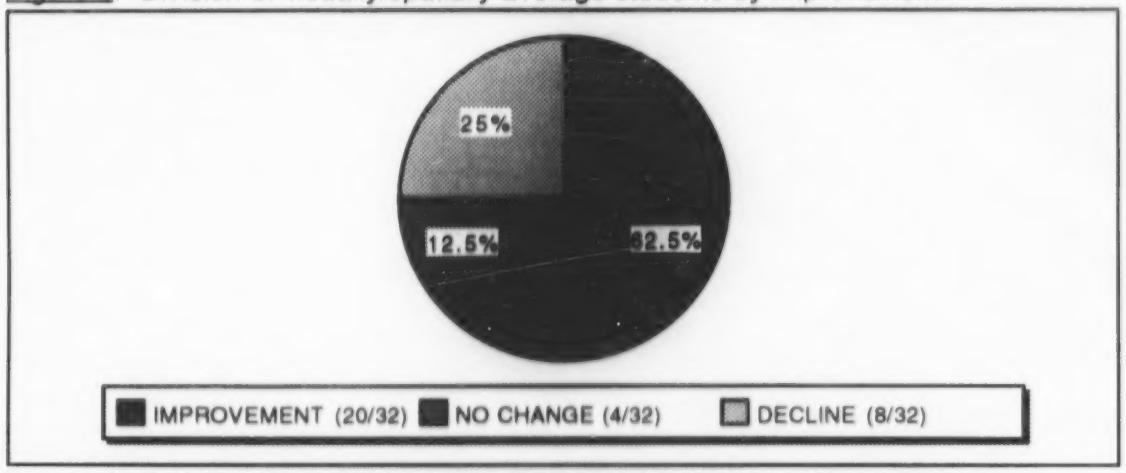


Figure 7. Division of visually/spatially challenged students by improvement.

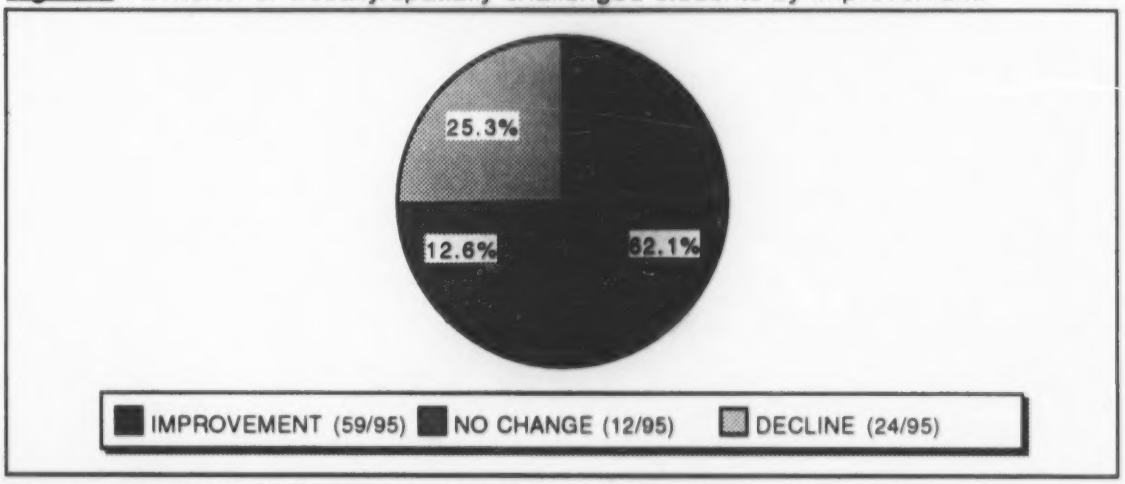


Figure 8. Division of all students into improvement groups.

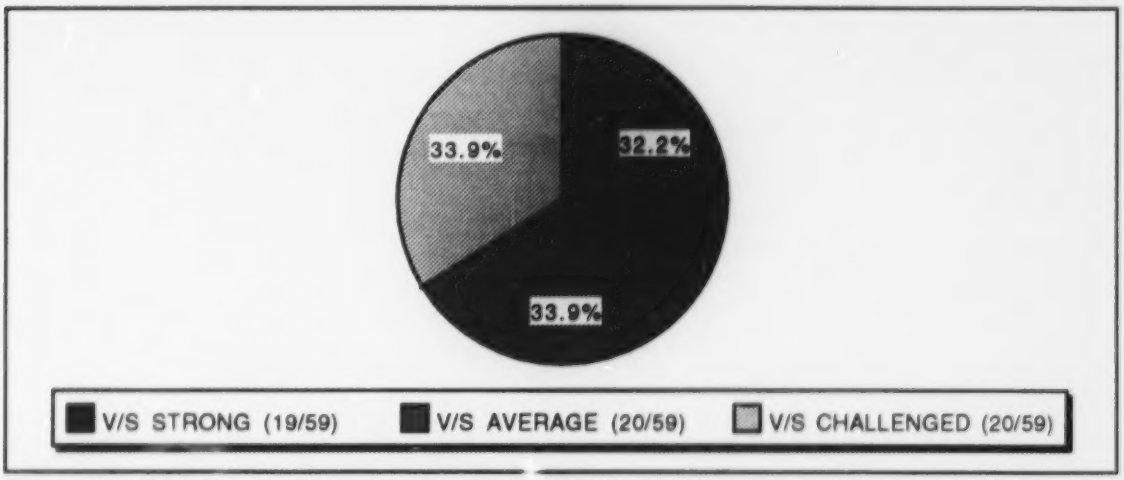


Figure 9. Division of students who improved.

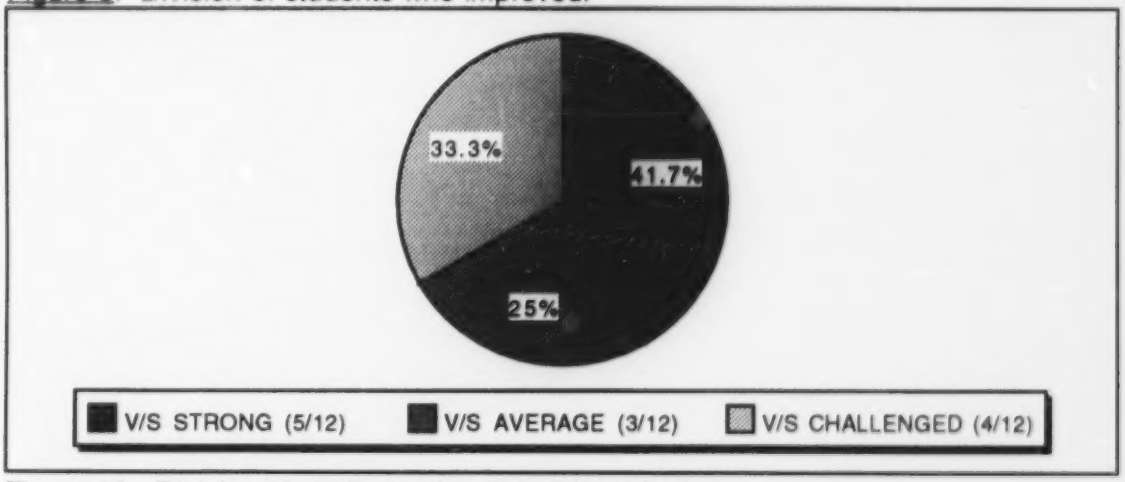


Figure 10. Division of students who showed no change.

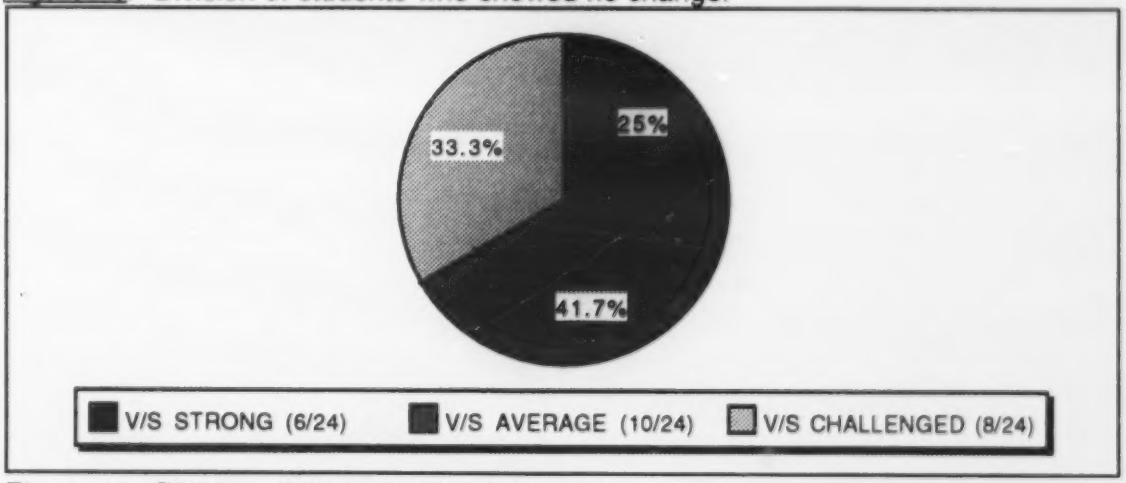


Figure 11. Division of students who declined.

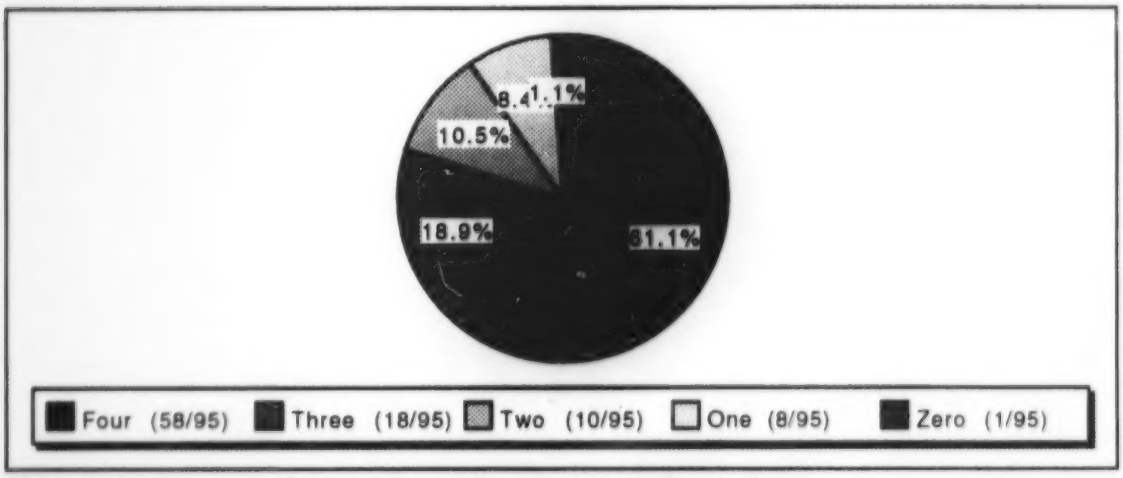


Figure 12. Number of visual organizers conceptually attained.

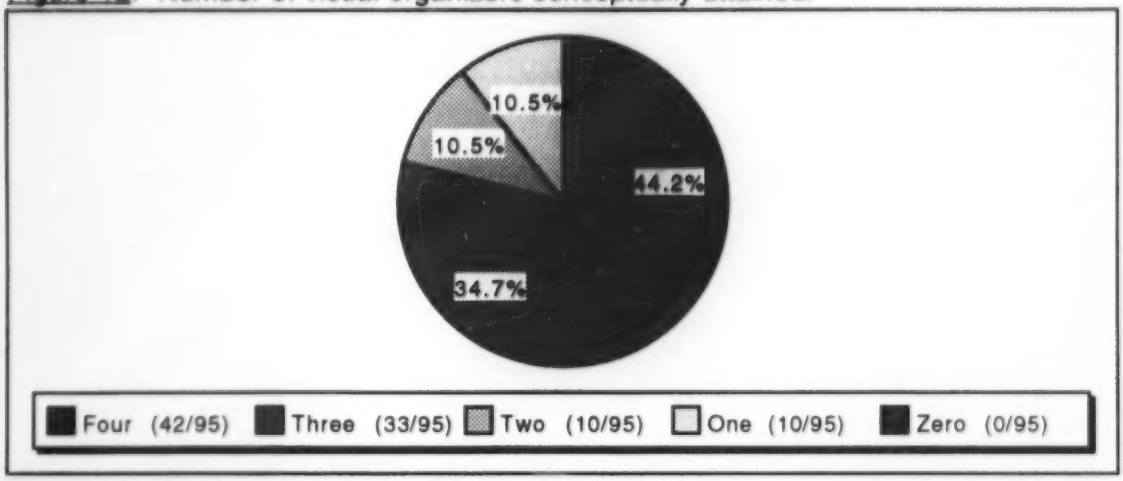


Figure 13. Number of visual organizers transferred.

The students had the opportunity to create and use graphic organizers for the post test. Most of the students interviewed felt that the graphic organizer helped them on the test. The overall improvement on the post test proved this to be true. Unfortunately, they would not create graphic organizers for assignments unless they were specifically instructed to do so.

The students at Site C had a reaction to the graphic organizers that set them apart from their counterparts at the other three sites. The Site C students were not particularly receptive to teacher made graphic organizers. Instead, they preferred to

create their own designs. One possible explanation to this is that these students, in order to survive in their environment, must learn to interpret symbols in their community.

Conclusions and Recommendations

One of the key postulations challenged by this study was whether or not the content area reading comprehension of visually/spatially challenged students would benefit from the use of graphic organizers. An underlying assumption was that the content area reading comprehension of visually/spatially intelligent students would benefit from the use of graphic organizers. The results show that the assumption about the visually/spatially intelligent students was correct. The results also show that the visually/spatially challenged students made gains in reading comprehension in the content area. The data indicates that most of the students showed improvement.

While this data is useful for showing trends in student performance, more enlightening conclusions can be drawn from examining the raw scores of each visual/spatial group individually. While all of the groups showed improvement, it is significant to note that group C showed the most dramatic improvement. In addition, group C had the lowest pretest average score and the highest post test average score. Based on these results, the use of graphic organizers does have a positive effect on the content area comprehension of visually/spatially challenged students.

While the above results are important, the conclusions are limited in that a pretest and post test do not guarantee retention and transfer. The reading style survey was administered to all students four weeks after the post test. Part of this survey questioned student habits and attitudes, while another part of it questioned the students as to their retention and transfer of the four graphic organizers presented. The results gleaned from this survey indicated that 61.1% of all students retained knowledge of all four of the graphic organizers, and 18.9% of all students retained

knowledge of three of the graphic organizers presented. Hence, 80.0% of the students retained a minimum of 75% of the graphic organizers presented.

As revealing as this information may be, the transfer of this knowledge is more important. The results of this survey indicate that 44.2% of all students in the study can transfer all four graphic organizers to the reading of another subject, while 34.7% of the students can transfer three of the graphic organizers to the reading of another subject. Therefore, 78.9% of the students can transfer the use of three or more graphic organizers to the reading of another subject.

Recommendations

The results of this research suggest that the use of graphic organizers can benefit students in many ways. First, graphic organizers should be used with all students. One might think that only the visually-spatially talented student can benefit from the use of graphic organizers. The research suggests that visually-spatially challenged students can benefit from the graphic organizers even more. Perhaps this can be attributed to the fact that these students are forced to process the information in order to make it fit into a graphic organizer. In addition, graphic organizers can be used at all three stages of reading: prereading activities, during reading activities, and post reading activities.

The list of possibilities for graphic organizers goes beyond reading comprehension. We suggest four possibilities. First, graphic organizers can take the place of standard classroom notes to give the students a more structured format for concepts presented in the classroom. Second, graphic organizers can be used with cooperative groups to bring ideas together and promote social skills. Third, graphic organizers can be used to review concepts. Fourth, in addition to the four graphic organizers we used, many other graphic organizers exist and should be implemented.

Because there are so many graphic organizers currently in existence, we offer

two cautions. Some graphic organizers tend to be confusing, so they can do more harm than good. Thus, educators must remember that the simpler the organizer, the better. Also, some students have a tendency to use the wrong organizer for the job. Thus, educators must remember that students need to be taught to decide which organizer is best for the job at hand.

In order to continue having students acquire the strategic reading skills that they need to cope in the changing world, educators can pursue four strategies. First, educators should teach graphic organizers other than those used in this study. Second, educators should encourage students to create meaningful graphic organizers from content area reading materials. Third, educators should encourage students to transfer graphic organizers to new reading experiences. Finally, students should learn graphic organizers well enough to adapt the organizers to their own multiple intelligence strengths. In summary, we have found that graphic organizers aid in reading comprehension: a vital life skill necessary in our own demanding and changing work place.

REFERENCES

Allington, R.L. (1984). So what is the problem? Whose problem is it? Topics in Leaning Disabilities, 3 (4), 91-99.

Allington, R.L. (1980). Learning through reading: An introduction for content area teachers. Lexington, MA: D.C. Heath.

Ausubel, D.P. (1968). The psycholoby of meaningful verbal learning. New York: Grune & Stratton.

Bean, T.W., Singer, H., Sorter, J., & Frazee, C. (1986). The effect of metacognitive instruction in outlining and graphic organizer construction on students' comprehension in a tenth-grade world history class. Journal of Reading Behavior, 18 (2), 153-169.

Beissner, K. L. (1993). Using and selecting graphic technique to acquire structural knowledge. New Orleans, LA: Association for Educational Communications and Technology. (ERIC Document Reproduction Service No. ED362151).

Bellanca, J. (1990). The Cooperative Think Tank. Arlington Heights, IL: IRI/Skyllight Publishing.

Bellanca, J. (1992). The Cooperative Think Tank II. Arlington Heights, IL: IRI/Skyllight Publishing.

Boothby, P. R. & Alvermann, D. E. (1984). A classroom training study: The effect of graphic organizer instruction on fourth graders' comprehension. Reading World, 23 (5), 325-339.

Calfee, R. C. & Curley, R. (1984). Structure of prose in the content areas. In J. Flood (Ed.), Understanding reading comprehension (pp. 161-180). Newark, DE: International Reading Association.

Chapman, C. (1993). If the shoe fits.... Arlington Heights, IL: IRI/Skylight Publishing.

Ciborowski, J. (1992). Textbooks and the students who can't read them: A guide to teaching content. Brookline Books.

Clarke, J.H. (1990). Patterns of thinking: Integrating learning skills with content teaching. Bosotn, MA: Allyn & Bacon.

Cochran, J. A. (1993). Reading in the conten areas for junior high and high schools. Boston, MA: Allyn & Bacon.

Cooter, R. B. Jr., & Flynt, E. S. (1996). Teaching reading in the content areas: Developing content literacy for all students. Englewood Cliffs, NJ: Prentice Hall.

Cooper, J. D., Warncke, E. W., & Shipman, D. A. (1988). The what and how of reading instruction (2nd ed). Columbus, OH: Merrill Publishing Company.

Dupois, M., Lee, J. W., Badiali, B., Askov, E. N. (1989). Teaching & reading in the content areas. Glenview, IL: Scott Foresman, & Co.

Gardner, H. (1983). The theory of multiple intelligences. New York, NY: Basic Books, Inc.

Gardner, H. (1985). The mind's new science. New York, NY: Basic Books, Inc.

Gardner, H. (1991). The unschooled mind: How children think and how schools should teach. New York, NY: Basic Books, Inc.

Gardner, H. (1994). Teaching for understanding in the disciplines and beyond. Teacher's College Record, 96 (2), 198-218.

Gardner, H. (1995). Multiple intelligences as a catalyst. English Journal, 84 (8), 16-18.

Griffin, E.C., Malone, L.D., & Kameenui, E.J. (1985). Effect of graphic organizers on fifth grade students. Journal of Educational Research, 89 (2), 98-106.

Irwin, J. W., (1986). Teaching reading comprehension process. Englewood Cliffs, NJ: Prentice-Hall, Incorporated.

Irwin-DeVitis, L., & Pease, D. (1995). Using graphic organizers for learning and assessment in middle level classrooms. Middle School Journal, 23 (5), 57-64.

Jones, B.F., Pierce, J. & Hunter, B. (1989). Teaching students to read. New York, NY: Macmillan Publishing Company.

Lapp, D. & Flood, J. (1986). Teaching students to read. New York: Macmillan Publishing Company.

Lazear, D.D. (1992). Teaching for multiple intelligences. Bloomington, IN: Phi Delta Kappa Educational Foundation. (Eric Document Reproduction Service No. ED356227).

Maria, K. (1990). Reading comprehension instruction: issues and stragegies. Parkton, MD: York Press.

McGee, L.M. & Richgels, D.J. (1985). Teaching expository text structure to elementary students. The Reading Teacher, 38 (4) 739-748.

Moore, D.W. & Readence, J.E. (1980). A meta-analysis of the effect of graphic organizers on learning from text. In M.L. Kamil & A.J. Moe (Eds.), Perspectives in reading research and instruction (pp. 213-217).

Moore, D.W., & Readence, J.E. (1984). A quantitative and qualitative review of graphic organizer research. The Journal of Educational Research, 78 (1), 11-17.

Morgan, H. (1996). An analysis of Gardner's theory of multiple intelligences. Roiper Review, 18 (4) 263-269.

Piccolo, M.A. (1987). Expository text structure: Teaching and learning strategies. The Reading Teacher, 40 (8) 838-847.

Pruitt, N. (1993). Using graphic organizers in content area subjects. New Jersey: Kean College. (ERIC Document Reproduction Service No. ED355 483).

Schallert, D.L., & Tierney, R.J. (1982). Learning from expository text: The interaction of text structure with reader characteristics. (Final report: NIE-G-79-0167). Austin: University of Texas.

Simmons, D.C., Griffin, C.C., & Kameenui, E.J. (1988). Effect of teacher-constructed pre- and post-graphic organizer instruction on sixth grade science students' comprehension and recall. The Journal of Educational Research, 82 (1), 12-21.

Smagorinsky, P. (1995). Multiple intelligences in the English class: an overview. English Journal, 84 (8), 19-26.

Thompson, E. H. (1993). It's not so hard: Preparing students for reading comprehension. Schools in the Middle, 2 (3), 33-36.

Tonjes, M. J. & Zintz, M. V. (1987). Teaching reading thinking study skills in content classrooms (2nd Ed.). Dubuque, IA: Wm. C. Brown Publishers.

Vacca, R.T., & Vacca, J.L. (1989). Content area reading (3rd ed.). Glenview, IL: Scott Foresman.

APPENDIX A

MULTIPLE INTELLIGENCE INVENTORY

Personal Preferences Inventory

Circle the numbers of the questions that pertain to you.

1. I enjoy reading books and writing stories.
2. I am good at word games, such as crossword puzzles, Scrabble and password.
3. I often see clear visual images when I close my eyes.
4. I like to spend my free time outdoors.
5. I am sensitive to color.
6. Math and/or science are among my favorite subjects in school.
7. I know the tunes to many different songs or musical pieces.
8. I enjoy doing jigsaw puzzles, mazes and other visual puzzles.
9. I play in at least one sport or physical activity on a regular basis.
10. I can comfortably imagine how something might appear from a bird's eye view.
11. I consider myself a leader.
12. I consider myself to be strong willed and independent.
13. I prefer looking at reading material that is heavily illustrated.
14. I think in pictures an images.
15. I have opinions that set me apart from the crowd.
16. I like to draw, paint, sculpt, and participate in art activities.
17. I can hear words in my head before I read, speak, or write them down.
18. My life would be poor if there were no music in it.
19. I play a musical instrument.
20. I can easily read maps, charts and diagrams.
21. I draw accurate representations of people or things.
22. I ask questions about how things work.
23. I like to see movies, slides, or photographs.
24. I prefer group sports like badminton, volleyball, or softball to solo sports such as swimming and jogging.
25. I keep a personal diary or journal to record thoughts and feelings about my live.

APPENDIX B

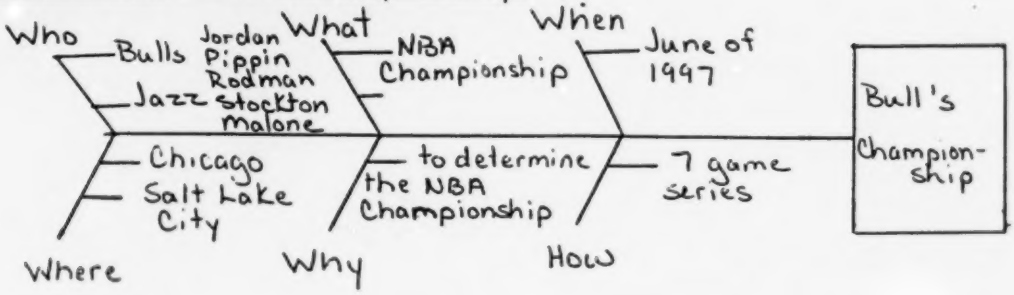
LESSON PLANS

1. Fishbone

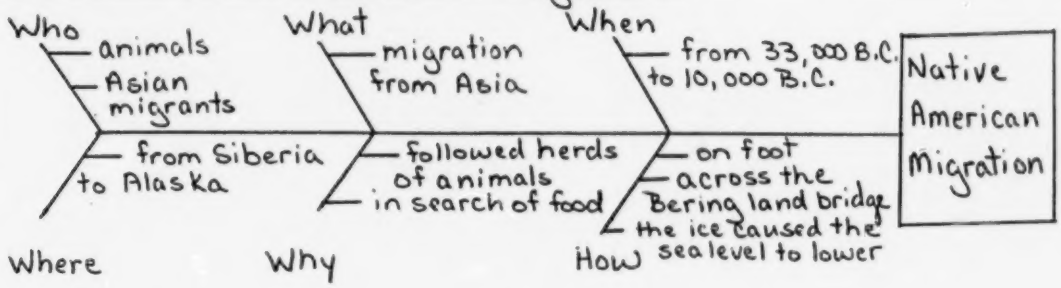
Native American Migration - Practice

Land of the Golden Mountains - Homework

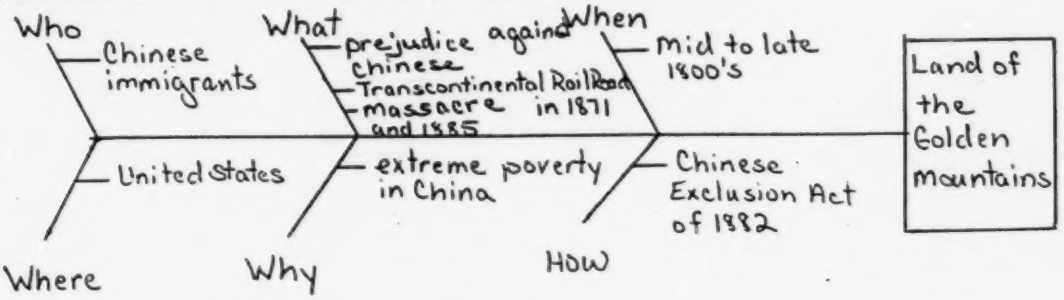
Introduction - NBA Championship



Practice - Native American Migration

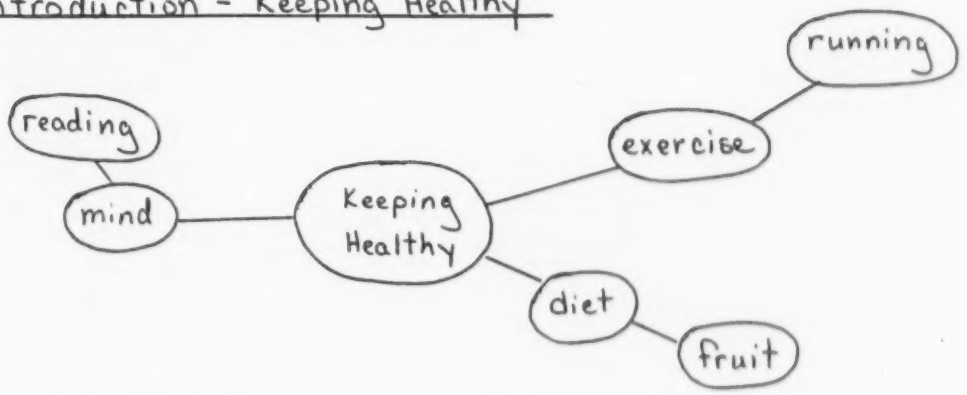


Homework - Land of the Golden Mountains



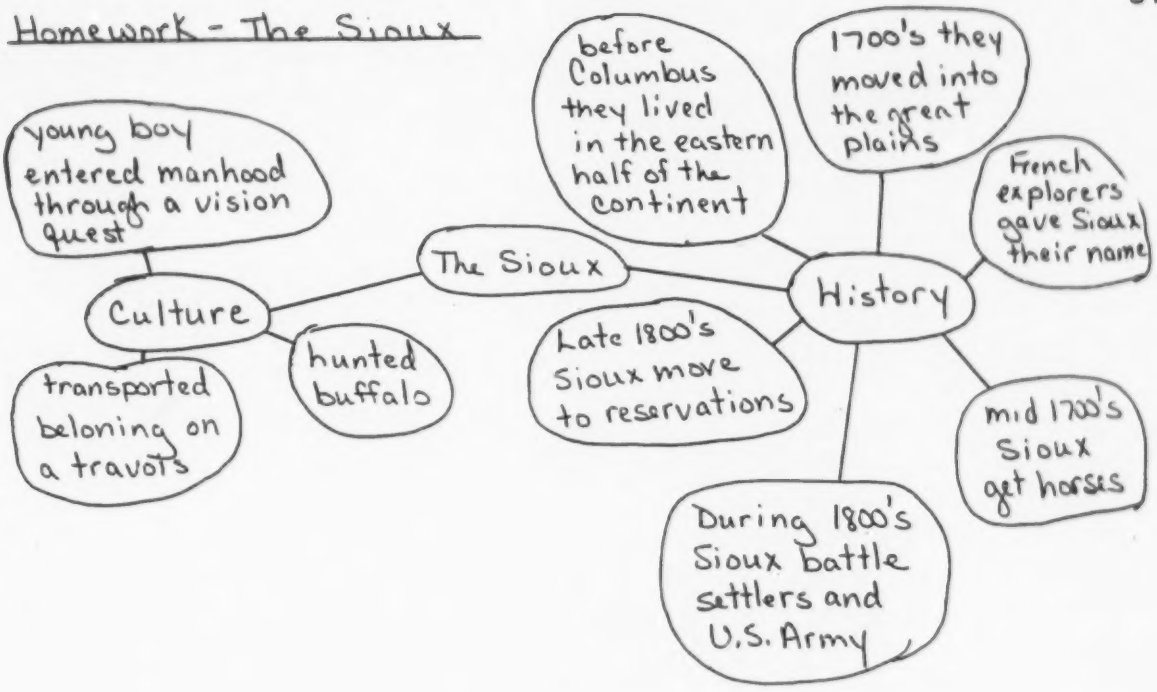
2. Concept Map
Buddhism - Practice
The Sioux - Homework

Introduction - Keeping Healthy



Practice - Buddhism

Homework - The Sioux


The Sioux
Culture
young boy entered manhood through a vision quest
transported beloning on a travois
hunted buffalo
History
before Columbus they lived in the eastern half of the continent
1700's they moved into the great plains
French explorers gave Sioux their name
Late 1800's Sioux move to reservations
mid 1700's Sioux get horses
During 1800's Sioux battle settlers and U.S. Army

3. Information Chart
Cave Painting - Practice
The Trickster - Homework

Introduction - Taste of Chicago

Who	What	When	Where	Why	How
people from the city and suburbs	food festival	every summer	Grant Park in Chicago	to highlight the ethnic diversity in the city	by finance from the city and corporate donations

Practice - Cave Painting

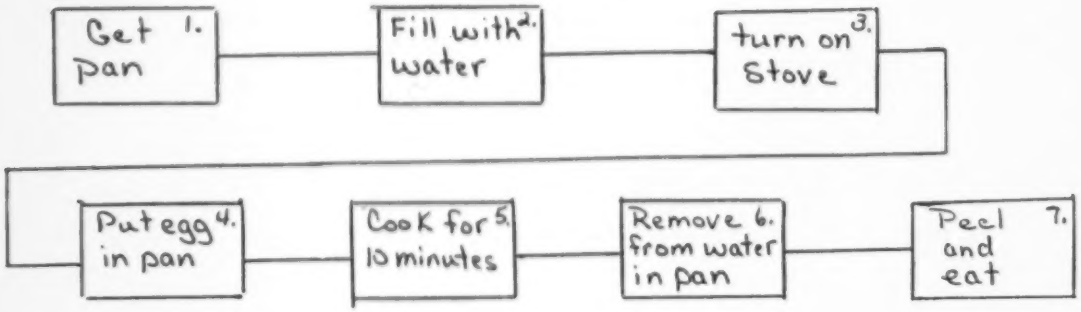
Who	What	When	Where	Why	How
prehistoric man	painted animals on cave walls	between 10 and 40 thousand years ago	in France and Spain	1. communication with the gods 2. magical control over animals 3. success in hunting	1. made paints from natural sources 2. used blow pipes 3. crayons 4. paints

Homework - The Trickster

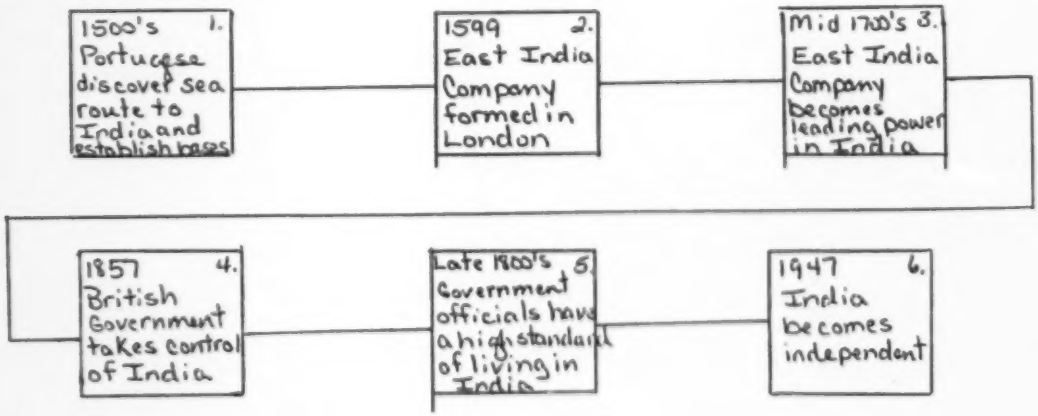
Who	What	When	Where	Why	How
Native Americans	coyote		Great Plains in the Southwest	explain qualities of the world around them	through stories

4. Sequence Chart
Colonization of India - Practice
La Brea Tar Pits - Homework

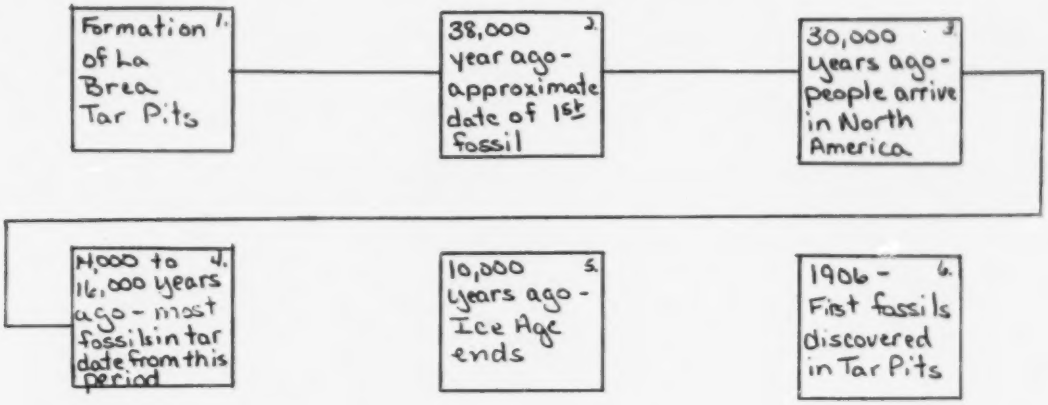
Introduction - How to boil an egg.



Practice - The Colonization of India


1500's 1. Portugese discover sea route to India and establish bases
1599 2. East India Company formed in London
Mid 1700's 3. East India Company becomes leading power in India
1857 4. British Government takes control of India
Late 1800's 5. Government officials have a high standard of living in India
1947 6. India becomes independent

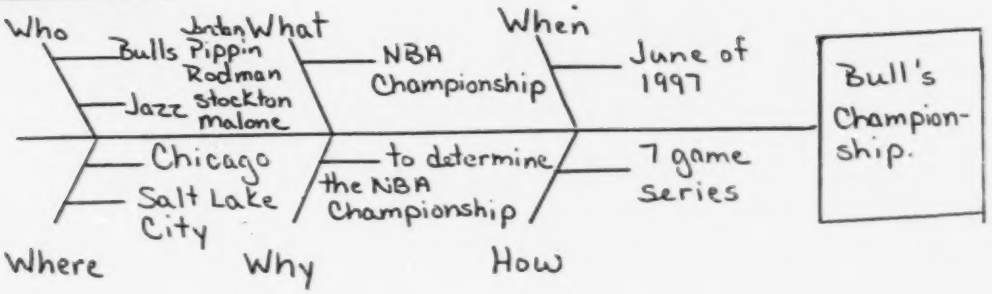
Homework - La Brea Tar Pits (not in order)


Formation of La Brea Tar Pits
1.
38,000 year ago - approximate date of 1st fossil
2.
30,000 years ago - people arrive in North America
3.
11,000 to 16,000 years ago - most fossils in tar date from this period
4.
10,000 years ago - Ice Age ends
5.
1906 - First fossils discovered in Tar Pits
6.

Review Lesson

Use all the introductions from the first four lessons.

1. Fishbone



2. Concept Map

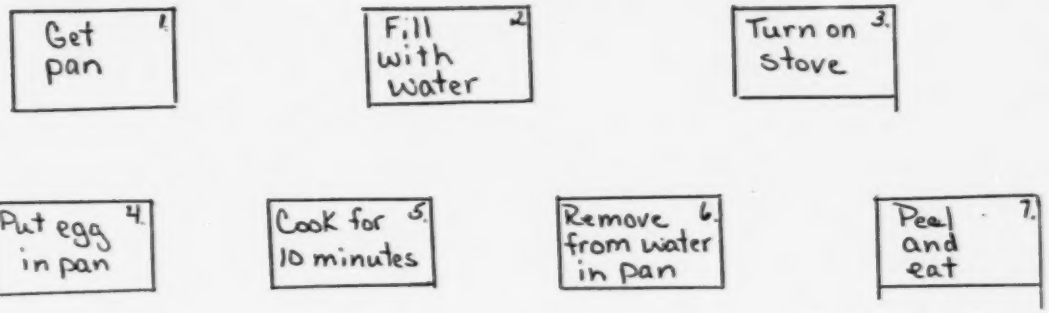
3. Information Chart

Who	What	When
people from the city and suburbs	food festival	every summer

Taste of Chicago

Where	Why	How
Grant Park in Chicago	to highlight the ethnic diversity in the city	by finance from the city and Corporate donations

4 Sequence Chart — How to boil an egg



APPENDIX C

STUDENT INTERVIEW QUESTIONS

Student Interview I

1. Which of the two graphic organizers seem to work best for you?

2. Will you use these graphic organizers in other classes? If yes, which ones?

3. Which other graphic organizers have you used before these were introduced?

Student Interview II

1. Which of the four graphic organizers seem to work best for you?

2. Have you used any of these graphic organizers in other classes? If yes, which ones?

3. Are there any graphic organizers that you know of that would benefit other students? What are they?

4. Did you use a graphic organizer on the post test?

APPENDIX D

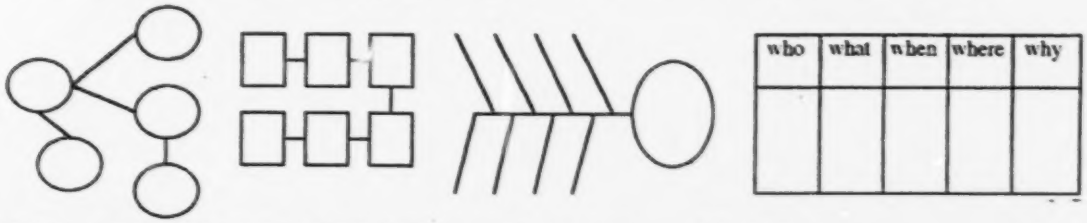
READING STYLE SURVEY

Reading Style Survey

Different people use different methods to comprehend what they read. Doing the following survey will help you learn about how you comprehend what you read. Check the box that best represents how much you do the following things while reading.

	Never	Seldom	Sometimes	Usually	Always
1. I take notes when I read.	☐	☐	☐	☐	☐
2. I draw pictures to understand what I read.	☐	☐	☐	☐	☐
3. When I look at a cartoon, I look at the pictures before reading.	☐	☐	☐	☐	☐
4. When I look at a cartoon, I read the words without looking at the pictures.	☐	☐	☐	☐	☐
5. Class discussions help me understand what I read.	☐	☐	☐	☐	☐
6. When reading a textbook, I use illustrations to help me understand what I have read.	☐	☐	☐	☐	☐
7. Answering written questions about what I have read helps me understand.	☐	☐	☐	☐	☐
8. When I have free time, I like to read for enjoyment.	☐	☐	☐	☐	☐

9. I can recognize the following graphic organizers: (circle the ones you can recognize)



10. I can successfully create the following graphic organizers: (circle the ones you can create)